



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,606	07/03/2003	Ying-Lin Chen	TS01-1020B	7294

7590 03/19/2004
George O. Saile
28 Davis Avenue
Poughkeepsie, NY 12603

EXAMINER

CHEN, JACK S J

ART UNIT	PAPER NUMBER
----------	--------------

2813

DATE MAILED: 03/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. <u>10/613,606</u>	Applicant(s) CHEN ET AL.	
	Examiner Jack Chen	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/3/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

In response to the communication filed on July 3, 2003, claims 12-29 are active in this application.

Information Disclosure Statement

The information disclosure statement filed on July 3, 2003 has been considered.

Oath/Declaration

Oath/Declaration filed on July 3, 2003 has been considered.

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
2. The disclosure is objected to because of the following informalities: page 17, third paragraph, line 5, the phrase "regions 65, Fig. 65" is unclear.

Appropriate correction is required.

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 2813

4. Claims 12-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Re claims 12 and 22, applicant recites the gate material for the gate electrode. However, it is noted that in the abstract section, line 4 and in specification, page 5, line 10 shows that “polyimide” is used as the gate electrode material (it appears that polyimide is a non-conductive material).

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 12-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 12, page 23, lines 13-15, the phrase “thereby removing said layer of liner oxide from the surface of *from* sidewalls of said gate electrode” is unclear.

Re claims 13 and 14, the term “N₂/H₂” is unclear (does it mean N₂ or H₂? Or N₂ with H₂?).

Re claim 22, page 26, lines 7-9, the phrase “thereby removing said layer of liner oxide from the surface of *from* sidewalls of said gate electrode” is unclear.

Re claim 22, page 26, lines 17-18, the phrase “nitridizing *the said* first and second surfaces of said layer of liner oxide *and second surfaces of said layer of liner oxide*” is unclear.

Re claim 22, page 26, line 19, the term “N₂/H₂” is unclear (does it mean N₂ or H₂? Or N₂ with H₂?).

Art Unit: 2813

Double Patenting

7. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

8. Claim 13 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 14.

When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 12-16, 18, 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Deshpande et al., U.S./6,512,266 B1.

Deshpande et al. Disclose a method for forming a semiconductor device, which comprises providing a substrate 10, active surface regions having been defined in the surface of

Art Unit: 2813

the substrate (fig. 1A); creating a layer of gate oxide 12 over the surface of the substrate (fig. 1A); depositing a layer of gate material 14 over the surface of the substrate (fig. 1A); patterning and etching the layer of gate material and the layer of gate oxide, creating a gate electrode structure (fig. 1A); creating a layer of liner oxide 22 over the surface of said substrate, including sidewalls and the surface of said gate electrode (fig. 1B); depositing a layer of gate spacer material 24 (fig. 1C) over the surface of said layer of liner oxide; etching said layer of gate spacer material, creating gate spacers 24 over sidewalls of said gate electrode (figs. 1C-1D), thereby removing said layer of liner oxide from the surface of from sidewalls of said gate electrode where said layer of liner oxide is not covered with said gate spacers (fig. , exposing D) first surfaces of said layer of liner oxide where said liner oxide is interposed between said layer of gate material and said gate spacers (fig. 1D) and where said liner oxide is furthest removed from the surface of said substrate (fig. 1D), further exposing a second surface of said layer of liner oxide where said layer of liner oxide overlies the surface of said substrate (fig. 1D); applying nitridation (figs. 1D-1E, i.e., due 112 problems, as best can be understood by the examiner: plasma-assisted to form oxynitride 28, which inherently shows using Nitrogen in order to form oxynitride) to said first and second surfaces of said layer of liner oxide, creating a layer of silicon oxy-nitride 28 overlying exposed surfaces of said gate electrode structure and said first and second surfaces of said layer of liner oxide (fig. 1E); removing said layer of silicon oxynitride (fig. 1F); and saliciding contact points to said gate electrode (col. 7, lines 17-30), see figs. 1A-2G, cols. 1-10 for more details.

Art Unit: 2813

Re claims 13 and 14, Deshpande et al. inherently shows using Nitrogen in order to form oxynitride 28 (Due 112 problems, as best can be understood by the examiner, which is using either nitrogen or hydrogen).

Re claim 15, Deshpande et al. Show the gate oxide is about 10 to 200 angstroms (fig. 1A, col. 4, lines 14-20)

Re claim 16, Deshpande et al. show the gate material comprises polysilicon (fig. 1A, col. 4, lines 26-41).

Re claim 18, Deshpande et al. show the gate spacer material comprising silicon nitride (fig. 1C).

Re claim 20, Deshpande et al. show the thickness of the liner oxide is about 2 to 400 angstroms (fig. 1B).

Re claim 21, Deshpande et al. show using cobalt for salicidation process (col. 7, lines 17-30).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

Art Unit: 2813

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 17, 19, 22-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deshpande et al., U.S./6,512,266 B1.

Deshpande et al. disclosed above (paragraph 10). However, Deshpande et al. is silent to show the thicknesses of the gate material (about 3000-7000 angstroms), gate spacer material (about 2000-3000 angstroms) and plasma temperature (about 250 degree C). Selecting suitable thicknesses for the gate material, spacer material and the plasma temperature is well known in the art.

Therefore, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to use any suitable thicknesses for the gate material, spacer material and using suitable the plasma temperature in order to optimize the processes. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Deshpande et al. by selecting the suitable thicknesses for the gate material, spacer material and using suitable temperature for the plasma, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Conclusion


14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Segawa, U.S./6,593,198 B2 teaches the similar process for forming the device.

Art Unit: 2813

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Chen whose telephone number is (571)272-1689. The examiner can normally be reached on Monday-Friday (9:00am-6:30pm) alternate Monday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead can be reached on (571)272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jack Chen
Primary Examiner
Art Unit 2813